TOYOTA MOTOR NORTH AMERICA | Product Regulatory Affairs
325 7th Street NW, Suite 1000, Washington, D.C. 20004

October 26, 2018

Mr. Christopher Lieske
Office of Transportation and Air Quality
Assessment and Standards Division
Environmental Protection Agency
2000 Traverwood Drive
Ann Arbor, MI 48105

Mr. James Tamm
Office of Rulemaking
Fuel Economy Division
National Highway Traffic Safety Administration
1200 New Jersey Avenue, SE
Washington, DC 20590

Subject: The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks [Docket Nos. EPA-HQ-OAR-2018-0283 and NHTSA-2018-0067]

Dear Mr. Lieske and Mr. Tamm:

Toyota Motor North America, Inc. (Toyota) appreciates the opportunity to provide comments on the above-referenced Notice of Proposed Rulemaking (NPRM) in conjunction with the midterm evaluation (MTE) of Corporate Average Fuel Economy (CAFE) and vehicle greenhouse gas (GHG) standards. Reopening the MTE was an important and necessary step to more fully consider the effects of changing circumstances on the feasibility of the previously finalized Environmental Protection Agency (EPA) GHG standards, as well the augural CAFE standards developed by the National Highway Traffic Safety Administration (NHTSA).

The attached comments and appendices address in detail a wide range of topics for which NHTSA and EPA requested comment. While the issues are broad, ranging from highly technical modeling procedures and technology evaluations to behavioral issues around consumer choice, four overarching points help frame Toyota's views on a pathway toward a final rule.

First, Toyota supports continued improvements in vehicle fuel economy performance and GHG reduction. This is what society and our customers expect from us, and aligns with our overall long-term corporate direction. As such, we do not support the proposed "Preferred Alternative" of flat standards from 2021-2026 model years (MYs). Toyota has a long leadership history in developing and deploying advanced fuel economy and GHG improvement technologies and will continue to do so into the future consistent with our "Environmental Challenge 2050" and subsequent global technology announcements, which include:

- By 2050, we aim to reduce CO2 emissions from our new vehicles sold globally by 90 percent, when compared to 2010.
- By 2030, approximately 50 percent (5.5 million) of our new vehicles sold per year globally will be electrified in some form, including one million zero-emission vehicles (ZEVs) per year.
- By 2025, our global goal is for every model in the Lexus and Toyota lineup to either be electric drive or have an electrified option.

October 26, 2016

Second, Toyota supports regulatory adjustments and expansion of flexibilities that will promote advanced technologies and continue to provide meaningful energy security and climate benefits while better aligning with market realities. Important assumptions used in developing the current EPA GHG standards and augural NHTSA CAFE standards have proven incorrect, including among others, significantly lower gasoline prices than expected, technology-specific fuel economy performance below what regulators projected, and the historic shift from cars to light-trucks and sport utility vehicles (SUVs), which continues to grow. While some automakers produce few, if any, light trucks and may be relatively unaffected by this market shift, the impact on industry at large is significant. The net effect of these changing circumstances is that much higher, and unsustainable levels of vehicle electrification will be needed - at the very time when such technologies are struggling to gain consumer acceptance.

Third, Toyota supports regulation that is technology agnostic. We believe there is more than one solution to reducing emissions and improving fuel economy, including, but not limited to, fuel cell electric vehicles, battery electric vehicles, hybrid and plug-in hybrid electrics, advances in internal and turbo-charged powertrains, and other forms of energy/technologies. As such, regulations should not penalize or artificially promote one technology over the other.

Finally, Toyota continues to support One National Program (ONP). We remain hopeful that adjustments can be made to the current regulations that will meet the needs of both federal regulatory agencies, key state regulators, the auto industry, and the motoring public, and render the debate about separate state regulations in this space a moot point. Such an outcome would provide the planning certainty needed to effectively and efficiently run our business. At the same time, planning certainty itself is not the sole objective, as regulatory targets must be balanced with technical and market feasibility, affordability and safety to meet the needs of consumers.

We trust you will find the attached comments helpful and we look forward to working with all related stakeholders as this process moves towards a final rule. Toyota is a member of both the Alliance of Automobile Manufacturers and Global Automakers. We support the comments of those two organizations and incorporate them by reference.

Please feel free to contact me, or Richard Gezelle, at (202) 775-1700 if you have any questions.

Sincerely,

Tom Stricker

Tom Stricker
Vice President
Product Regulatory Affairs
Toyota Motor North America, Inc.

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October 26, 2018

Mr. Jonathan C. Morrison
Acting Chief Counsel
National Highway Traffic Safety Administration
1200 New Jersey Avenue, SE
West Building W41-227
Washington, DC 20590

RE: Confidential Business Information Request

Dear Mr. Morrison:

This letter is in reference to The National Highway Traffic Safety Administration's (NHTSA) confidential business information regulations under 49 C.F.R. Part 512. Toyota respectfully requests that the information submitted herein to NHTSA be entitled to confidential treatment under 5 U.S.C. §552(b) because it constitutes confidential business information.
Pursuant to the requirements of 49 C.F.R. Parts 512.4 and 512.8, included are the materials and information for which confidentiality is being requested, the Certificate in Support of Request for Confidentiality (*see* Appendix A), and relevant supporting information.

I. Description of Information for Which Confidentiality is Requested

The CBI information provided to NHTSA includes Toyota's cost and effectiveness estimates for various technology packages relative to the Volpe center's estimates for similar technology packages. The Volpe Center will use this information for its modeling efforts in support of the MY 2022-2025 CAFE Standards.

II. Justification for the Basis for the Claim of Confidentiality

Pursuant to 49 CFR § Part 512.8, NHTSA requires that any person requesting confidentiality shall justify the claim by identifying the standard(s) under which the confidentiality request should be evaluated in accordance with 49 CFR § 512.15. The following describes the critical justifications for Toyota's claim of confidentiality.

A. The Information Qualifies as a Trade Secret

The information provided is the result of both innovation and substantial effort of Toyota's engineering personnel.

B. There Would be Substantial Harmful Effects of Disclosure of the Information

The data provided is highly sensitive and is the result of a significant technology development process at Toyota. The release of this information to competitors would create substantial competitive damage to the company.

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C. Toyota Takes Careful Measures to Ensure the Information is Not Customarily Disclosed or Made Available to the Public

The release of this data to competitors would create significant competitive damage to the company. Toyota implements careful measures to ensure that any data shared with a business partner is confidential, with significant penalties applied in the circumstance of any breach of the confidentiality agreement.

III. Time Period Requested for Confidential Treatment

Because of the nature of the information, Toyota respectfully requests confidential treatment of the information submitted herein for an indefinite period of time.
Please contact me at the above referenced address and telephone number with any responses or inquiries you may have regarding this request. We would be happy to further discuss this issue with you.

Sincerely,

Richard Gezelle, Jr.
Senior Program Manager
Product Regulatory Affairs

Attachment I – Comments of Toyota Motor North America, Inc.

Notice of Proposed Rulemaking: Safer Affordable Fuel-Efficient Vehicles Rule
Docket ID Numbers: NHTSA-2018-0067 and EPA-HQ-OAR-2018-0283
October 26, 2018

Toyota Motor North America, Inc. appreciates the opportunity to provide comments on the above-referenced joint Notice of Proposed Rulemaking (NPRM). Our comments on the NPRM are organized as follows:

***NOTE**: For the sake of brevity, we use the term "agencies" to refer collectively to NHTSA and EPA. When referring to a specific entity, we do so by name, e.g. EPA and NHTSA.*

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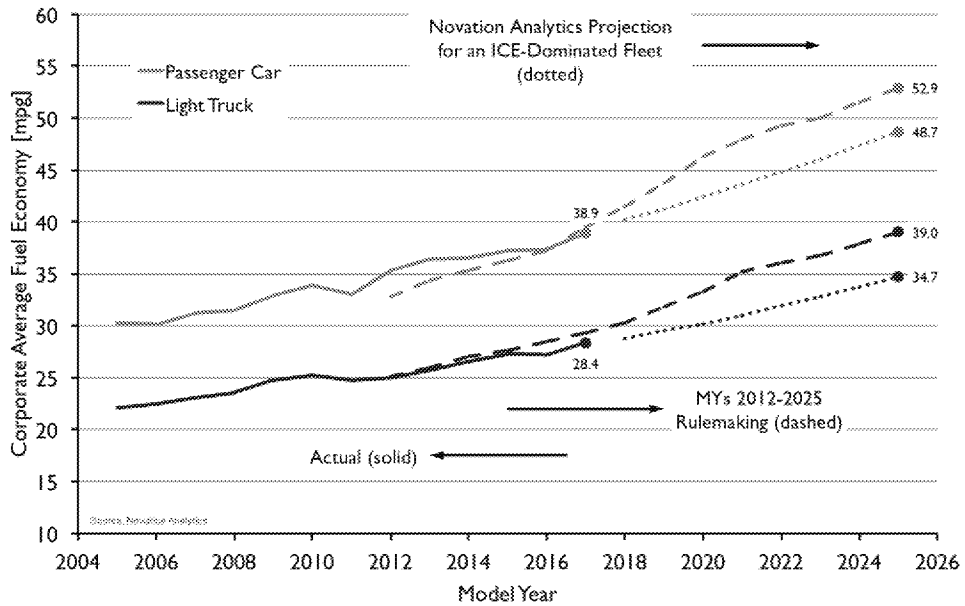
Attachment I – Comments of Toyota Motor North America, Inc.
Notice of Proposed Rulemaking: Safer Affordable Fuel-Efficient Vehicles Rule
Docket ID Numbers: NHTSA-2018-0067 and EPA-HQ-OAR-2018-0283
October 26, 2018

1) Modeled Technology Effectiveness and Costs

The mid-term evaluation (MTE) is intended to determine whether the GHG standards and augural CAFE targets (referred to as the "no-action alternative" in the proposed rulemaking) are still appropriate after reexamining the assumptions and conditions underlying the 2012 final rule. The evaluation is designed to address the inherent uncertainty in setting standards up to 12 years before implementation and has centered around the cost and effectiveness of technologies deemed necessary to comply.

EPA's first Final Determination issued in January 2017 found that "… the MY2022-2025 standards can be met largely through advances in gasoline vehicle technologies, such as improvements in engines, transmissions, light-weighting, aerodynamics, and accessories" and further stated "... the standards are achievable using very low amounts of strong hybrid and all-electric vehicles".[1] Toyota commented at that time[2,3] and continues to believe that improvements in conventional gasoline powertrains alone will be insufficient for achieving the post-2021 model year targets, and that compliance requires levels of electrified powertrains today's market will not support. As illustrated in Figure 1, Novation Analytics, Inc. simulated fuel economy and CO2 performance of the U.S. fleet with its physics-based ENERGY tool and determined a predominate mix of internal combustion engine is not capable of complying with the no-action alternative.[4]

Figure 1 – Conventional Gasoline Powertrains Fall Short of Future Standards



[1] Final Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation – Executive Summary; (Pg. 4)
[2] Toyota Draft Technical Assessment Report comments, Appendix I (7 Pgs.)
[3] Toyota Proposed Determination comments, Appendix I – Confidential Business Information (Pgs. 1-7)
[4] SAE International High-Efficiency IC Engine Symposium, April 7-8, 2019, Detroit, MI, USA

KG Duleep, of H-D Systems and a noted expert in this field, has similarly concluded "…if all conventional technology must be used to meet the 2025 requirements on the base vehicle, as EPA and NAS predict, then accounting for sales of many high line models means that ***conventional technology will fall short of the requirements***. … our recent analysis of manufacturers' product plans here at H-D Systems suggest that a large number of new hybrid and electric models must be introduced in the near future in order for firms to comply…"[5] (emphasis added).

The "no-action alternative" in the proposed rulemaking will push conventional gasoline powertrains to their practical limits of effectiveness when cost, performance, and emissions requirements are considered. Toyota is concerned that the current rate of required improvements will force investments in the most advanced conventional technologies, and that these investments will be stranded by an abrupt shift to electrification.

Modeling Is Source of Technology Assessment Gap

The discrepancy between industry and prior regulatory assessments stems from agency modeling relying on overly optimistic assumptions about technology cost effectiveness and deployment rates. Toyota provided the agencies with Confidential Business Information (CBI) detailing the conventional gasoline technologies that could be deployed for certain high-volume Toyota vehicle models in 2025 model year, along with the resulting best-case CO2/fuel economy performance.[6] The agencies used a spreadsheet tool derived from the Alpha model to extrapolate from Toyota's CBI data the projected performance for Toyota's entire 2025 model year line up. While Toyota generally agreed with the efficacy of the Alpha-based spreadsheet tool, we reached different conclusions about compliance of the simulated 2025 MY fleet. The root cause was that the agency's analysis failed to account for customer requirements (cost, power, weight-adding options, etc.) that erode optimal fuel economy, and normal business considerations that govern the pace of technology deployment.[7]

Updated Modeling Better Reflects Reality

Modeled technology cost, effectiveness, and compliance pathways in the proposed rulemaking rely on more recent data as well as more realistic assumptions about the level of technology already on the road today, the pace of technology deployment, and trade-offs between vehicle efficiency and customer requirements. It's also now easier to run the model and validate the impact a given policy scenario has on a manufacturer's annual CAFE/GHG performance and the associated compliance technology costs and benefits.

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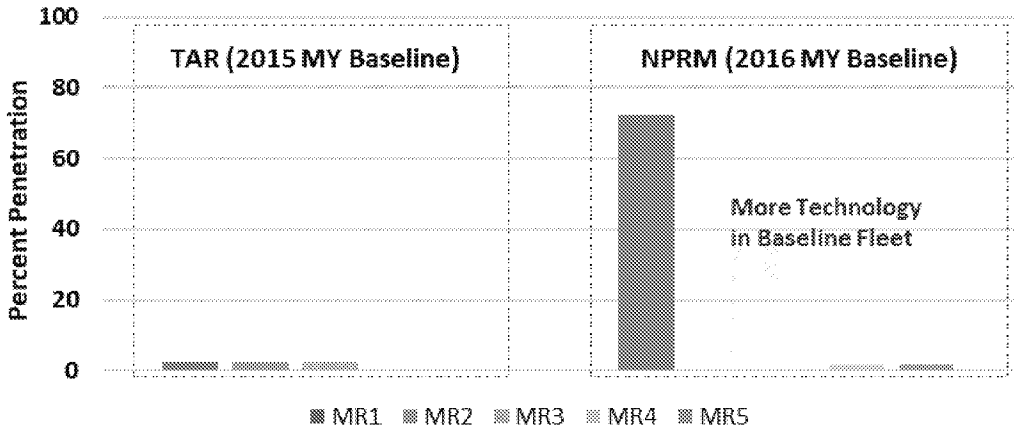
[5] Duleep, K.G., "Complying with the CAFE Standards: Will It Be More Difficult Than Predicted?" [Blog post.] Resources for the Future. February 11, 2016.
[6] Toyota Proposed Determination comments, Appendix I – Confidential Business Information (Pgs. 2-7)
[7] Toyota Revised Final Determination comments (Pgs. 5-7)

Updated Baseline Fleet

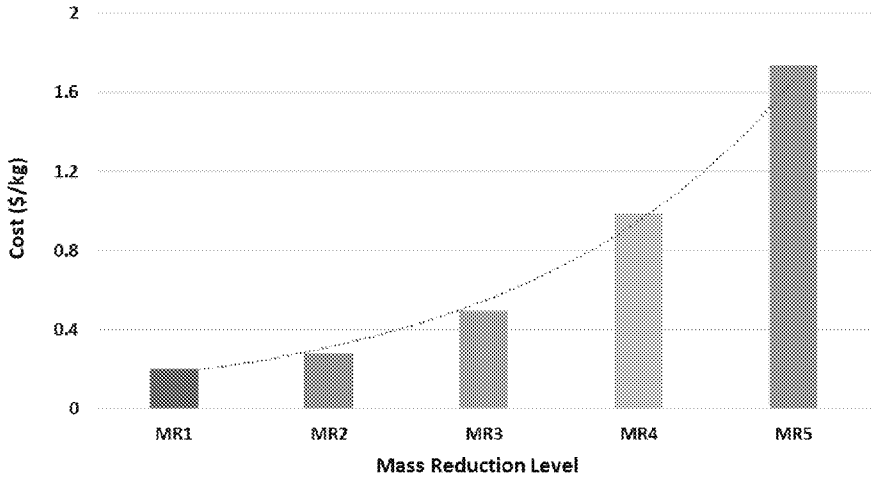
Future CAFE and GHG performance is now projected from a 2016 MY baseline fleet which encompasses powertrain and tractive energy (e.g. mass reduction, aerodynamic, and rolling resistance) improvements more representative of vehicles on the road today. The 2016 baseline generally contains higher levels of technology compared to the 2014 and 2015 MY baseline fleets. The adjusted baseline particularly affects rolling resistance, aerodynamics, and mass reduction as the draft Technical Assessment Report (TAR) indicated only a low level of technology in the fleet as seen below for mass reduction (Figure 2).

Figure 2 – Mass Reduction in Toyota Baseline Fleet: TAR vs. NPRM



The baseline upgrade is significant because technologies in the baseline are no longer available for incremental improvements toward compliance with increasingly stringent future standards. Instead more complex and expensive grades of the same technologies or completely different compliance pathways than assumed in the TAR and Proposed Determination (PD) are needed. Figure 3 shows how moving further up the technology tree for certain pathways such as mass reduction increases costs exponentially, although in this case we believe the actual cost values are underestimated. We request the baseline fleet supporting the final rule incorporate the 2018 model year or most recent information available.

Figure 3 – Mass Reduction Cost – RAV 4



Acknowledging Vehicle Performance

Advancements in technology effectiveness are appropriately no longer assumed performance neutral. Prior to this proposed rulemaking, the modeling allocated 100 percent of the benefit from a new or improved technology to fuel economy. Any vehicle performance improvements required additional technology advancement, the costs of which were considered beyond the scope of the modeling.

Suppressed engine power contributed to the discrepancy in Toyota and agency outcomes for the previously noted Alpha study based on Toyota CBI. Dedicating all powertrain improvements to fuel efficiency is inconsistent with market reality. As discussed in the Market Challenges Section below, most consumers purchase vehicles for more than fuel economy alone. Torque and horsepower are desired attributes which enhance a vehicle's value proposition increasing the prospect that our customers will be willing to pay for at least some of the higher cost of CAFE and GHG compliance reflected in new vehicle prices. A proper balance of vehicle efficiency and performance is critical to being able to achieve the mainstream market acceptance required for compliance.

Toyota supports the agencies' inclusion of performance classes in compliance modeling where a subset of certain models is defined to have higher performance and a commensurate reduction in fuel efficiency. [8]

[8] Performance classes include the expanded Volpe Technology Classes of SmallCarPerf, MedCarPerf, SmallSUVPerf, and MedSUVPerf.

Pace of Technology Deployment

The modeling now better accounts for factors that limit the rate at which new technologies enter and then diffuse through a manufacturer's fleet. Bringing new or improved vehicles and technologies to market is a several-year, capital-intensive undertaking. Once new designs are introduced, a period of stability is required so investments can be amortized. Vehicle and technology introductions are staggered over time to manage limited resources. Agency modeling now better recognizes the inherent constraints imposed by realities that dictate product cadence. We agree with the agencies' understanding that "the simulation of compliance actions that manufacturers might take is constrained by the pace at which new technologies can be applied in the new vehicle market", and we are encouraged to learn that "agency modeling can now account for the fact that individual vehicle models undergo significant redesigns relatively infrequently". The preamble correctly notes that manufacturers try to keep costs down by applying most major changes mainly during vehicle redesigns and more modest changes during product refresh, and that redesign cycles for vehicle models can range from six to ten years, and eight to ten-years for powertrains.[9]

This appreciation for standard business practice enables the modeling to more accurately capture the way vehicles share engines, transmissions, and platforms. There are now more realistic limits placed on the number of engines and transmissions in a powertrain portfolio which better recognizes manufacturers must manage limited engineering resources and control supplier, production, and service costs. Technology sharing and inheritance between vehicle models tends to limit the rate of improvement in a manufacturer's fleet.

In past modeling, engine downsizing followed tractive energy reductions achieved from lightweighting, improved aerodynamics, and reduced rolling resistance in an unconstrained manner. This approach frequently resulted in an unmanageable number of engine configurations within a vehicle platform. Toyota's modeled fleet in the TAR contained 14 engine configurations which has dropped to 11 in the proposed rulemaking. Further, engine downsizing and power reduction sometimes exceeded limits beyond basic acceleration requirements needed for vehicle safety and customer satisfaction. The Alliance has commented on gradeability impacts of excessive downsizing which Toyota supports.[10] We also support the agencies' decision to include gradeability as a performance metric to avoid underpowered engines and overestimated fuel savings. We encourage more extensive use of the metric in future modeling.

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[9] 83 Fed. Reg. at 43162
[10] Alliance of Automobile Manufacturers comments on The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks; Pg. 125

Finally, modeled technology deployment now attempts to reflect the diversity in manufacturer capabilities, experience, resources, and resulting compliance strategies. The inertia of capital investments and engineering expertise dedicated to one compliance technology or set of technologies makes it unreasonable for manufacturers to immediately switch to another technology path. As an example, the preamble "recognizes that Atkinson engine technology is not suitable for many vehicles due to performance, emissions and packaging issues, and/or the extensive capital and resources that would be required for manufacturers to shift from other powertrain technology pathways (such as turbocharging and downsizing) to standalone Atkinson cycle engine technology".[11] The TAR and PD modeling ignored the costs of sudden technology shifts, and the necessary orderly transition slows the pace of CAFE and GHG improvements.

Improved Modeling Narrows the Assessment Gap

The assessment of technology effectiveness and costs better align with Toyota's projections previously submitted in our comments on the draft TAR and PD under CBI.[12,13] We are submitting under CBI with our comments, updated technology walks for several vehicles that compare the latest agency modeled technology costs and benefits to Toyota's latest estimates for compliance with the no-action alternative. We have concluded the improved modeling has reduced, but not eliminated the assessment gap.

The RAV 4 and Camry technology walks (Figures 4 and 5) show modeled technology in the proposed rulemaking to be less cost-effective than assumed in the TAR. As a result, more sophisticated and expensive levels of technology are needed to comply. The walks illustrate lower fuel economy performance and higher costs for a given level of technology compared to the TAR. We note the draft TAR applied all available credits toward CAFE compliance (unconstrained) as a policy measure, whereas the NPRM restricts credits per the CAFE statutes governing standard setting (constrained).[14] The technology walks indicate both the TAR policy and CAFE constrained approaches.

[11] 83 Fed. Reg. at 43038
[12] Toyota Draft Technical Assessment Report comments, Appendix I (7 Pgs.)
[13] Toyota Proposed Determination comments, Appendix I – Confidential Business Information (Pgs. 1-7)
[14] Under unconstrained condition, limitations on credit carryforward, carryback and transfers still apply.

Figure 4 –RAV 4 AWD 2.5L Technology Walk

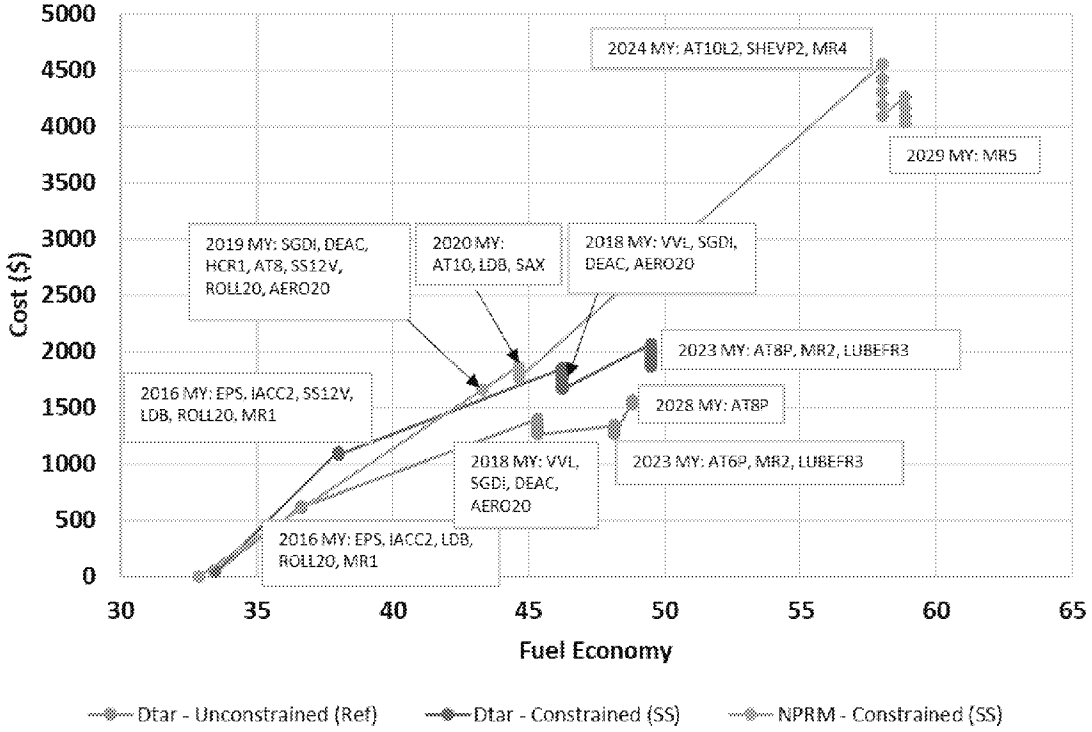


Figure 5 –Camry 2.5L Technology Walk

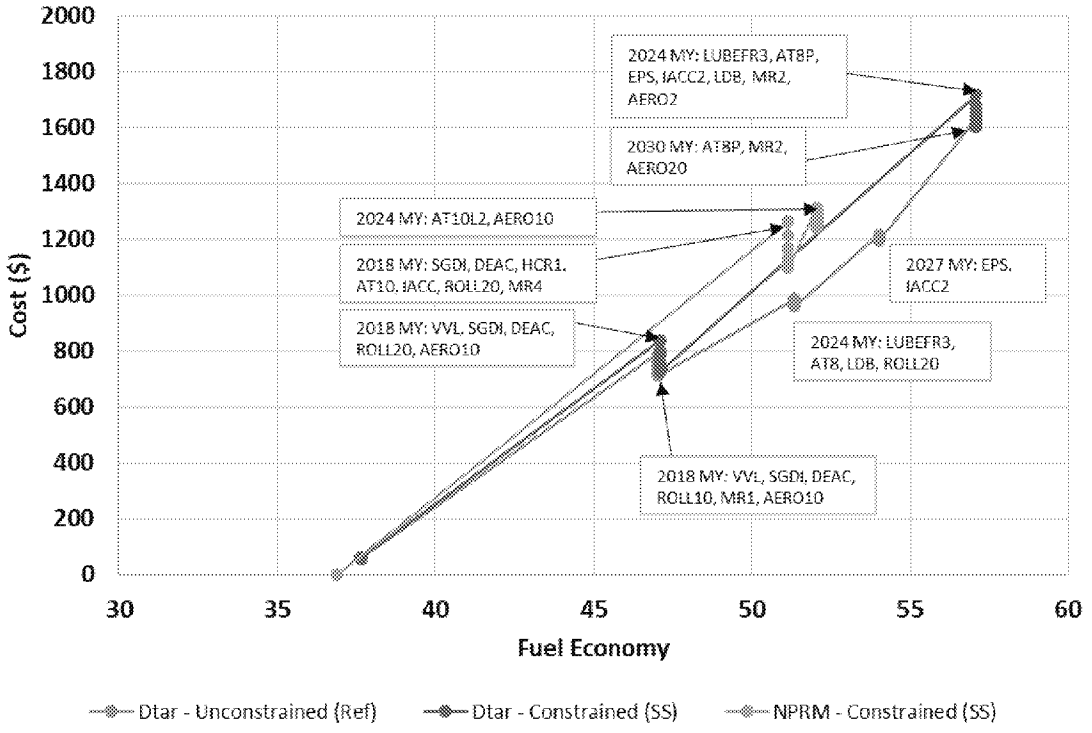
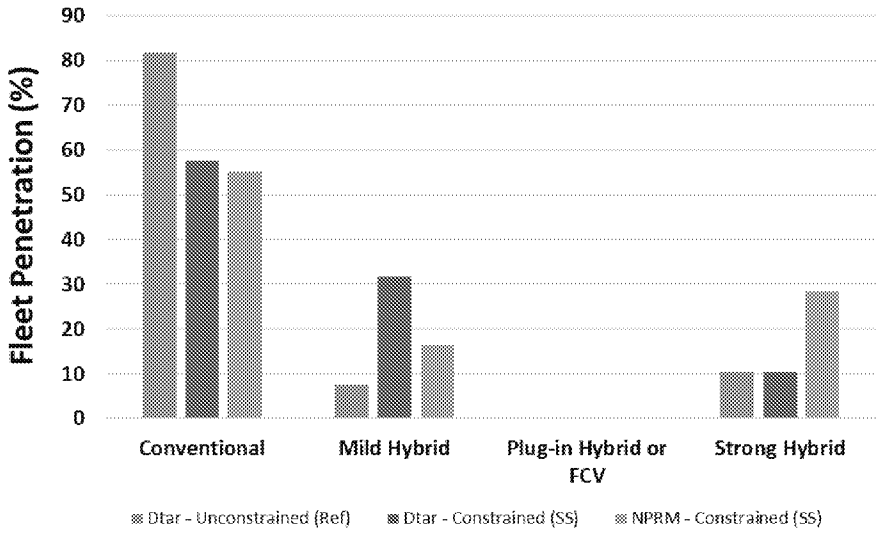


Figure 6 below shows the no-action alternative in the proposed rulemaking requires significantly higher levels of electrification compared to the TAR. In modeling of Toyota's fleet, mild hybrid comprises a 48V belt integrated starter generator system and strong hybrids include power split and P2 systems.

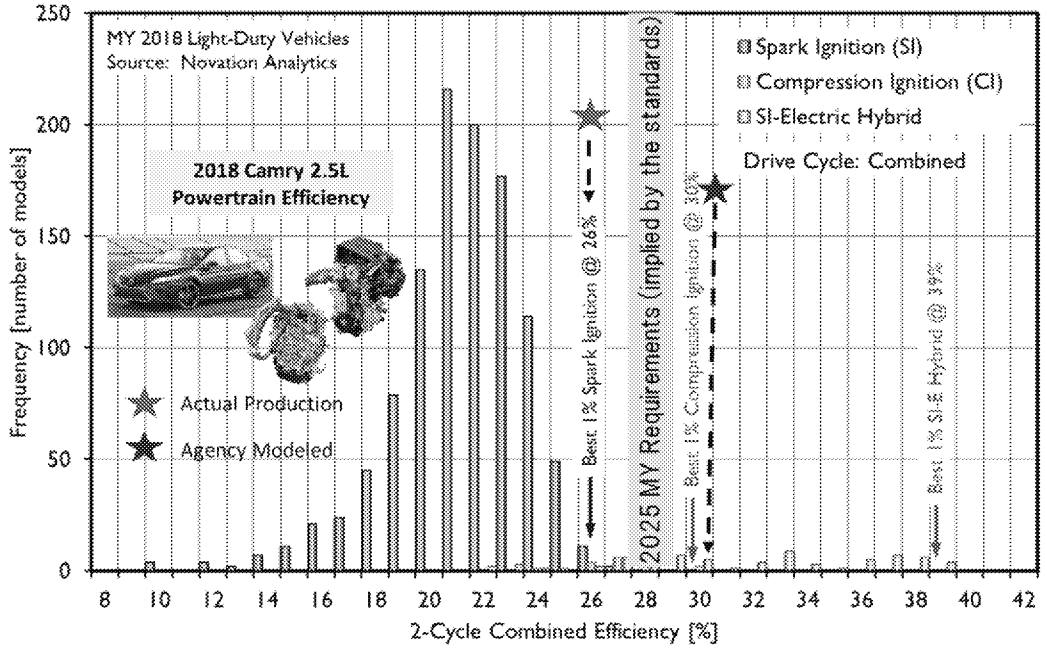
Figure 6 – Volpe Technology Penetration for Toyota 2025 MY Fleet



Modeling Adjustments Moving Forward

While modeling has improved overall and results tend to better align with Toyota's estimates, certain assumed technology cost and effectiveness inputs appear overly optimistic. For example, the agencies may still be relying on overstated effectiveness assessments for Atkinson cycle engine technology. Those past assessments resulted in the assumed powertrain efficiency for the 2018 model year Camry being rated higher than the actual production vehicle as seen in Figure 7. In addition to the technology walk for the 2018 Camry, Toyota's CBI submission with our comments will include a general cost effectiveness assessment for several technologies.

Figure 7 – 2018 Model Year Camry Powertrain Efficiency



There are also instances where the technology selected for Toyota's fleet compliance does not align with our expertise and experience. For Toyota's 2025 model year fleet, modeling for the no-action alternative estimates 16.0 percent fleet penetration for mild hybrids (BISG), 19.3 percent for P2 hybrids, and 9.1 percent for power split hybrids. Toyota does not believe either mild or P2 hybrid technology can achieve the 2025 model year targets. The extent to which mild hybrids will play a role in Toyota's fleet compliance has not yet been determined; however, it will be significantly lower than projected in the proposed rulemaking.

As discussed previously, the proposed rulemaking explains Atkinson engine penetration remains low in the modeling in part because it is unreasonable for companies already invested in turbocharged and downsized engines to switch their research, engineering, production resources to Atkinson technology with the time remaining to comply with the proposed CAFE and GHG standards. That same logic should apply to Toyota pursuing P2 hybrid or mild hybrids as aggressively as projected. While the modeled percentage of hybrids has significantly increased in the proposed rulemaking, that share would need to be significantly higher to achieve compliance with the standards in the no-action alternative. For Toyota, the diminishing returns of conventional gasoline technologies make conventional hybrids a more cost-effective compliance pathway.

2) Market Challenges

Toyota supports the agencies' renewed effort to understand the role of consumer choice in setting appropriate CAFE/GHG standards. Our concerns with the five percent annual efficiency improvement through 2025 model year required by the standards in the no-action alternative has never been about the availability of compliant technology, but rather how quickly it can be absorbed into the U.S. fleet through new vehicle purchases. As can be seen in Figure 8, the fuel economy of new vehicles in dealer showrooms has increased significantly since the standards have been enacted, but the market share of these vehicle lag. Our challenge is that CAFE and GHG compliance requires those highly efficient vehicles to be purchased, not just offered for sale.

Figure 8 – Availability and Purchase Trends for Improved Fuel Economy

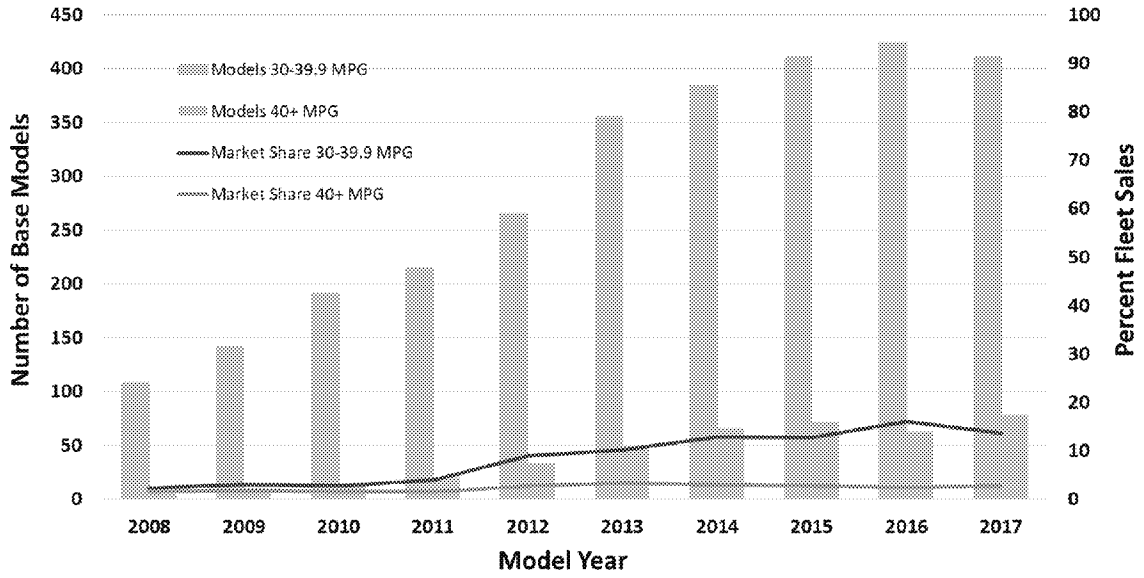
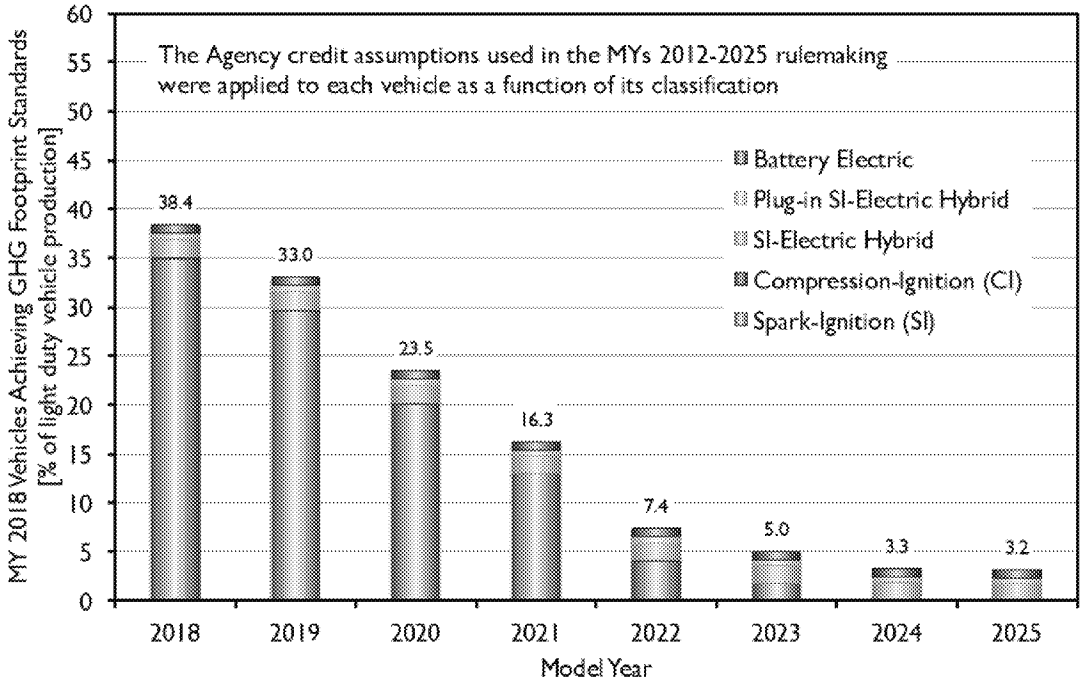


Figure 9 below illustrates the sales pressure electrified powertrains would face in achieving fleet compliance with the baseline. Just over 3 percent of 2018 model year vehicles are currently able to comply with their respective 2025 MY targets and all employ electrified powertrains.

Figure 9 – 2018 Model Year U.S. Fleet Compliance with Future Standards



Modeling Consumer Behavior

Past analyses in the TAR and PD assume new vehicle sales remain constant even as more stringent CAFE and GHG standards drive up the cost of compliance, on the basis that the fuel savings for consumers offset the increased vehicle costs. The new analyses and modeling are asking the right questions about how consumers value fuel economy and how consumer response to CAFE and GHG standards can affect vehicle sales volumes, employment, and the economy at large.

As we have mentioned in past comments, consumers value fuel economy and make purchase decisions based on their unique circumstances and the purpose of the vehicle being purchased.[15] As seen in Table 1, fuel economy is just one among a wide range of vehicle attributes such as power, styling, safety, capacity, and infotainment systems bidding for a consumer's limited funds that also must cover non-vehicle expenses such as housing, education health care, etc.

[15] Toyota Comments on Technical Assessment Report (Pgs. 9-26) and Toyota Proposed Determination comments (Pgs. 9-16).

Table 1 – Top Purchase Reason Ranking

Full-Size Truck	Compact SUV	Midsize Car
Reliability (dependability)	Reliability (dependability)	Reliability (dependability)
Overall quality of vehicle	Overall quality of vehicle	Overall quality of vehicle
Durability (long-lasting)	Value for the money	Value for the money
Overall quality of workmanship	Overall quality of workmanship	Durability (long-lasting)
Overall engine performance	Durability (long-lasting)	Ride comfort
Value for the money	Ride comfort	Overall quality of workmanship
Overall power and acceleration	Safety features	Price or deal offered
Ride comfort	Price or deal offered	Ease of handling
Seating comfort	Holds road well during hazardous drivir	Seating comfort
Price or deal offered	Ease of handling	Safety features
Ease of handling	Seating comfort	Manufacturer's reputation
Holds road well during hazardous drivir	Manufacturer's reputation	Vehicle reputation
Smoothness of transmission	Visibility when backing up	Visibility when backing up
Manufacturer's reputation	Visibility when making a turn	Gas or kWh mileage (fuel economy
Vehicle reputation	Warranty coverage	
Warranty coverage	Vehicle reputation	
Overall Quality of Interior	Overall engine performance	
Front compartment roominess	Practical vehicle	
Visibility when backing up	Overall Quality of Interior	
Quietness	Overall Cost of Ownership	
Overall interior styling	Smoothness of transmission	
Overall exterior styling	Front compartment roominess	
Safety features	Quietness	
Warranty coverage	Dealer's service	
Overall Quality of Interior	Gas or kWh mileage (fuel economy)	
Front compartment roominess		
Visibility when backing up		
Quietness		
Overall interior styling		
Overall exterior styling		
Safety features		
Visibility when making a turn		
Willingness of dealer to negotiate		
Dealer's service		
Towing capability		
Cost of service and repair		
Future trade-in or resale value		
Fun to drive		
Overall Cost of Ownership		
Practical vehicle		
4-wheel/all-wheel drive availability		
Exterior size - length, width, height		
Cargo capacity		
Dealership sales experience		
Exterior color		
Rebate/low interest rate		
Previous experience with manufacturer		
Passenger seating capacity		
Rear compartment roominess		
Previous experience with model		
Gas or kWh mileage (fuel economy)		

Source: 2018 US MaritzCX NVCS (Oct '17-Mar '18)

Preferences and the ability to pay for competing vehicle attributes can be diverse. This heterogeneity in consumer behavior has been previously interpreted in the TAR and PD

as being too complex and uncertain an undertaking from which CAFE/GHG policy conclusions can be drawn. To the contrary, heterogeneity in consumer preferences and decision behavior underscores the need for consumer choice studies to move beyond the traditional lumping of consumers into averages with the use of outdated logit models.

As to the agencies request for comments on the relationship between vehicle price increases, fuel economy and new vehicle sales, as well as the development and use of consumer choice models[16], Toyota recommends the current rulemaking consider recent research and data that better captures current technology and decision options. New research in the field of economics and decision science has provided better understanding of individual aspects of the consumer's decision process and has improved the methods and models for forecasting those decisions.

There are several research approaches that can approximate narrow aspects of the consumer's decision process by looking at a limited set of variables such as the importance of styling, safety, quality, and fuel economy. However, we know the decision-making process for consumers entails many variables, is impacted by external factors, and the entire process takes place in a dynamic environment where new information and influences can enter the picture at any time. Traditional research tools, such as choice based conjoint have been used to provide a good understanding of consumer choice behavior. These tools are applied to understand the choice drivers from everything from cereal to appliances to automobiles. Advances in these approaches allow researchers to delve beyond consumers stated "purchase drivers" and capture the underlying factors. For example, many consumers would cite safety as a key automotive purchase driver. These research tools often are used to review the complex inter-relationship between a stated factor, like safety, with other purchase drivers such as styling, performance, and comfort.

However, advances in data science, the proliferation of consumer and market data available to researchers, and the availability of relatively inexpensive yet powerful computer processing platforms have given rise to other techniques that can more accurately model consumer choice and forecast demand. Tools like agent-based models are flexible, scalable, and incorporate real-world consumer and macro market data. Agent-based modeling is a key advancement because this approach can model a larger number of variables than is the case with designs like choice based conjoint, which are limited to six to ten choice variables. It can also incorporate exogenous factors that we know influence consumer choice, such as economic factors, as well allowing for a range of scenarios. Thus, they can be adapted to exploring the various permutations to drive both compliance-based and market-based strategies at the auto manufacturer level.

Toyota also recommends analyses be clustered into homogeneous market segments where the right questions can be asked of appropriate consumer groups. Any consumer

[16] 83 Fed. Reg. at 43075 and 43077.

study sample should be segmented based on critical differences such as household income, ability to pay, debt load, vehicle usage scenarios, number of vehicles in

household, new vs. used vehicle purchases, geographical differences, and life stage. Research has shown that consumer segments can be determined statistically with one of several methods such as K-Means, Multi-Dimensional Scaling (MDS), or Principal Component Analysis (PCA). Research also shows that there are always discrepancies between stated and revealed choice consumer studies. It is critical that policy not rely solely on one method but integrate the results of historical action (revealed) and future expectations (stated) while recognizing that no method will be 100% accurate.

Furthermore, uncertainty in individual models should not be confused with uncertainty in overall consumer behavior. Empirical data and derived knowledge on general behavior patterns and decision-making reveals important outcomes and the necessary baseline with which to validate models and other consumer decision and preference analysis. Appropriate modeling can level-set near-term bounds for potential sales ranges in response to a range of economic and policy scenarios.

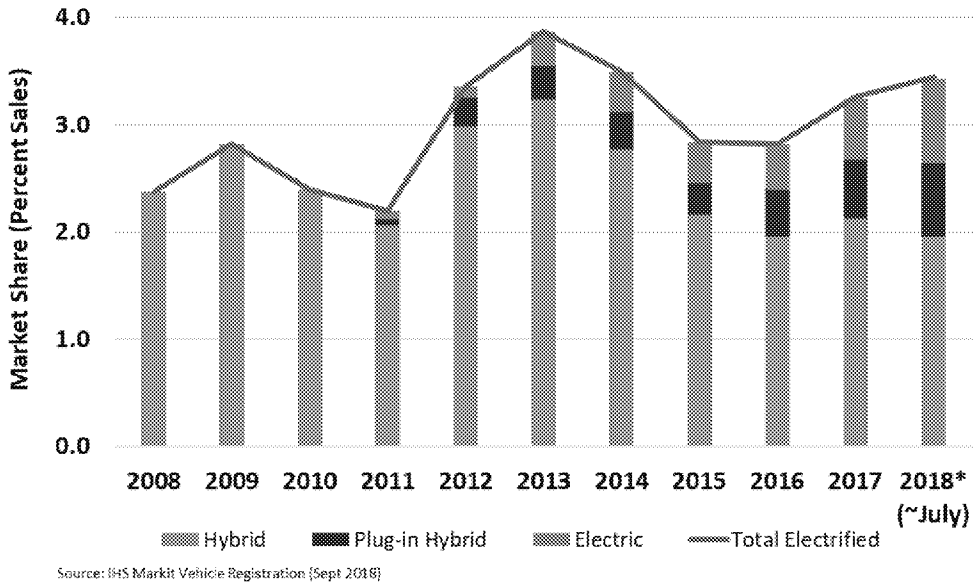
Current Consumer Trends

Modeling is not required to know that consumers are not buying electrified powertrains (which range from conventional gasoline hybrids to battery electric vehicles and fuel cell vehicles) at the levels needed to comply with the no-action alternative. Toyota agrees with the agencies' finding that "… we no longer assume manufacturers can pass on the entire incremental cost of hybrid, plug-in hybrid, and battery electric vehicles to buyers of those vehicles. The difference between the buyer's willingness-to-pay for those technologies, and the cost to produce them, must be recovered from buyers of other vehicles in a manufacturer's product portfolio or sacrificed from its profits, or sacrificed from dealership profits, or supplemented with State or Federal incentives (or, some combination of the four)." [17] The electrified powertrain market challenge is not an issue of supply, but rather demand as Figure 10 below illustrates. The sales volume of electrified powertrain technology needed to support compliance with the no-action alternative would need to far surpass current consumer demand.

Consumers are cautious of electrified powertrain technologies given the perception of "risk and trade-off" vs. current conventional technologies. Even with media attention towards electrified vehicles, sales have maintained less than 4% of total retail sales.

[17] 83 Fed. Reg. at 43083.

Figure 10 – Market Share for Electrified Powertrains



Source: IHS Markit Vehicle Registration (Sept 2018)

Most consumers are not seriously considering electrified powertrains for their next vehicle purchase as indicated in Table 2 below. Interest in and willingness to accept electrified powertrains are highly dependent on consumers' attitudes and beliefs, the vehicle segment from which they intend to purchase as well as their geographic location, and the associated weather conditions.

Table 2 – Next Vehicle Powertrain Consideration

① Hybrid	
Definitely Would	14.5%
Probably Would	15.8%
Maybe/Maybe Not	25.0%
Probably Not	17.3%
Definitely Not	27.5%
Formatted Subset Total	100.0%
Formatted Sample Total	100.0%
Unweighted Sample Total Count	18192

② Plug-in Hybrid	
Definitely Would	7.82%
Probably Would	9.18%
Maybe/Maybe Not	18.69%
Probably Not	22.02%
Definitely Not	42.29%
Formatted Subset Total	100%
Formatted Sample Total	100%
Unweighted Sample Total Count	17,737

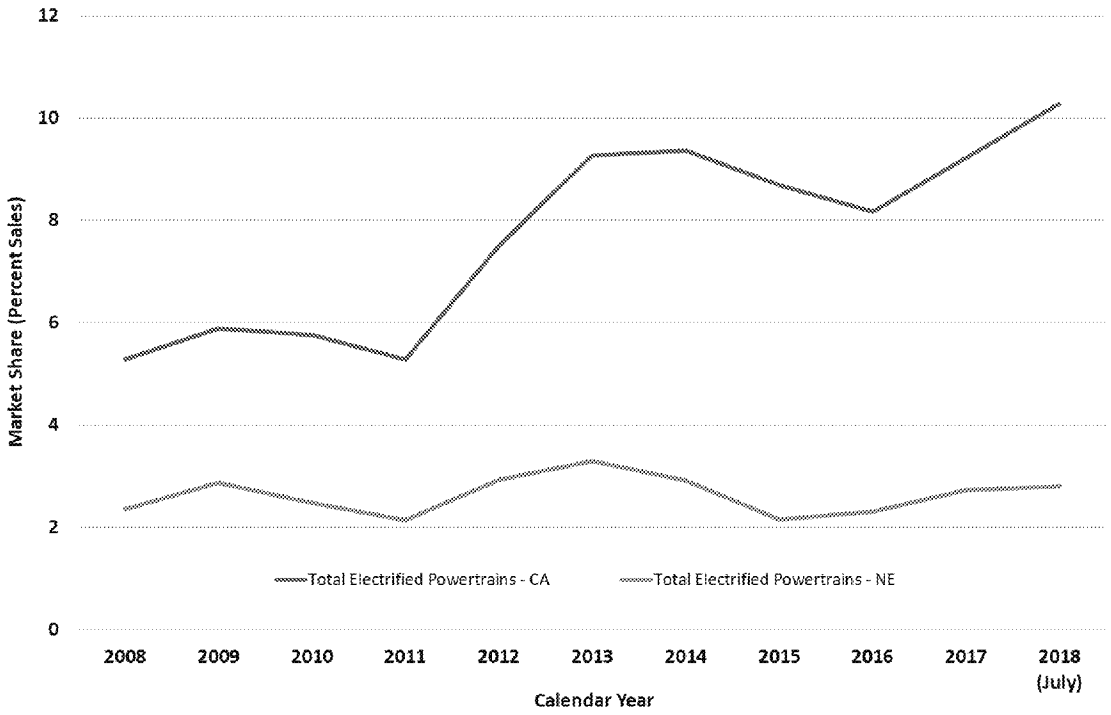
③ Electric	
Definitely Would	9.8%
Probably Would	10.3%
Maybe/Maybe Not	21.5%
Probably Not	22.0%
Definitely Not	36.4%
Formatted Subset Total	100.0%
Formatted Sample Total	100.0%
Unweighted Sample Total Count	17,444

④ Hydrogen	
Definitely Would	4.19%
Probably Would	6.54%
Maybe/Maybe Not	18.65%
Probably Not	24.39%
Definitely Not	46.23%
Formatted Subset Total	100%
Formatted Sample Total	100%
Unweighted Sample Total Count	17,144

Source: 2018 US Maritz CX NVCS (Oct '17-Mar '18)

Interest in and willingness to accept electrified powertrains are highly dependent on consumers' attitudes and beliefs, the vehicle segment from which they intend to purchase, as well as their geographic location and the associated weather conditions. Figure 11 illustrates the disparity in electrified vehicles sales between Northeast and California where conditions and circumstances are more conducive to consumer acceptance of electrified powertrains.

Figure 11 – Geographic Sales Differences for Electrified Powertrains



A universal challenge for the mainstream acceptance of any powertrain technology having a plug remains the need for consumers to change behaviors and expectations learned from their experience with conventional gasoline powertrains. The greater the inconvenience caused by the required behavioral changes, be it charging times, frequency of refueling, or vehicle performance, the greater the resistance to that change. Consumers will need time to consider, experience, and perhaps eventually purchase vehicles having a plug. Policy focused on consumer behavior/interest can play a major role in expanding consumer consideration. In China, major metropolitan cities have a waiting list for vehicle license plates. However, for customers of zero emission vehicles, there is no wait. Any comparison of U.S. technology purchase patterns and GHG and fuel economy performance to other countries first requires an understanding of the underlying policies (tax incentives, driving privileges, etc.) and conditions (fuel price, economic, etc.) in each country.

Toyota hypothesizes that in order to increase the vehicle fleet mix toward electrified powertrains in the U.S., the transaction price of electrified vehicles may need to be below

the price of comparable conventional powertrain technologies to offset consumer-perceived risks and trade-offs. Such a price structure is not sustainable.

Moving Forward

Toyota supports the agencies' deeper evaluation of consumer acceptance and the efforts to model the impact consumer decisions can have on the technology choices and vehicle purchases that dictate CAFE and GHG performance. We agree with the finding that consumers are not likely to purchase sufficient volumes of the highly efficient technologies needed for compliance with the CAFE and GHG no-action alternative, primarily because of their price premium over today's mainstream conventional technologies, but also in some cases because of required behavioral changes. We support the agencies intent to further refine their evaluation of consumer behavior, and develop and use consumer choice models. Toyota looks forward to working with the agencies in better understanding factors affecting consumer choice, and in developing policies to promote consumer decisions toward higher efficiency vehicles.

We suggest the agencies consider the econometric model developed by NERA Economic Consulting and Trinity Consultants for the Alliance. The Alliance comments explain how the model estimates consumer acceptance of vehicles by accounting for the relationship between the cost of fuel efficient technologies, vehicle sales, and scrappage. Expected vehicle sales are estimated with a nested logit model, a statistical model accepted by economists for predicting market acceptance.

3) Importance of Flexibilities and Compliance Considerations

Toyota strongly supports incentive programs and compliance flexibilities in CAFE and GHG regulations. Flexibilities have the potential to allow manufacturers to better manage technology investment and deployment which helps reduce compliance costs while achieving overall environmental and energy goals.

The proposed rulemaking questions the practical value of flexibilities including credit trading, and seeks comment as to whether some adjustments and non-statutory incentives and other provisions should be eliminated and stringency levels adjusted accordingly.[18] Proposed alternatives 3 and 7 relax the no-action alternative standards while eliminating the off-cycle and air conditioning efficiency provisions from the GHG and CAFE programs. Every alternative (besides no-action) eliminates the air conditioning leakage credit. Toyota opposes any flexibility provision being eliminated from either program. As described further below, we request the agencies improve existing flexibilities, extend the life of those set to sunset, and expand the applicability of those with a limited scope.

[18] 83 Fed. Reg. at 42999

We agree standards and flexibilities together define program stringency, but believe the value of flexibilities extends beyond pure stringency contribution. Flexibilities can be structured to accelerate environmental benefits (early adoption and over compliance), manage cost-effective compliance planning (banking and trading), account for real world benefits not captured by a more than a 40 year-old official test cycle (off-cycle), and promote highly efficient technologies (advanced technology incentives). Each category above except for technology incentives reduces compliance costs while maintaining the intended benefits of the standards –which is lost if the provisions are eliminated.

Technology incentives such as the Advance Technology Vehicle multiplier can erode the benefits of the standards in the near term, but as the proposed rulemaking acknowledges, with the promise of "greater GHG emissions reductions in the longer-term, where such technologies today are limited by higher costs, market barriers, infrastructure, and consumer awareness".[19]

Toyota views technology incentives not as market distorting, but rather as assisting the gradual transition from conventional gasoline powertrains to electrified powertrains, autonomous vehicles, and possibly to new mobility models such as ridesharing which all can help attain societal goals concerning climate change, energy security, traffic congestion, and safety. The near-term challenge is cost, driving range, infrastructure, and other attributes that don't yet match the value proposition of mainstream conventional gasoline technologies. Eliminating flexibilities and just adjusting the standards accordingly misses the opportunity to support the innovation needed to overcome those current deficiencies, and gain the possible future payoff in petroleum savings, GHG reductions, improved safety, and job creation.

We do not share the concerns about incentives creating "competitive disadvantages for some manufacturers if they become overly reliant on flexibilities rather than simply improving their vehicles to meet that market demand".[20] Simply improving our vehicles with conventional technologies that meet today's consumer demand will not enable us to reach future climate and energy objectives. We need to build that demand, and technology incentives can assist in finding ways to reduce technology costs, stand up needed infrastructure, and raise consumer awareness and experience. At some point, technologies must stand on their own in the market at which point incentives can be phased out.

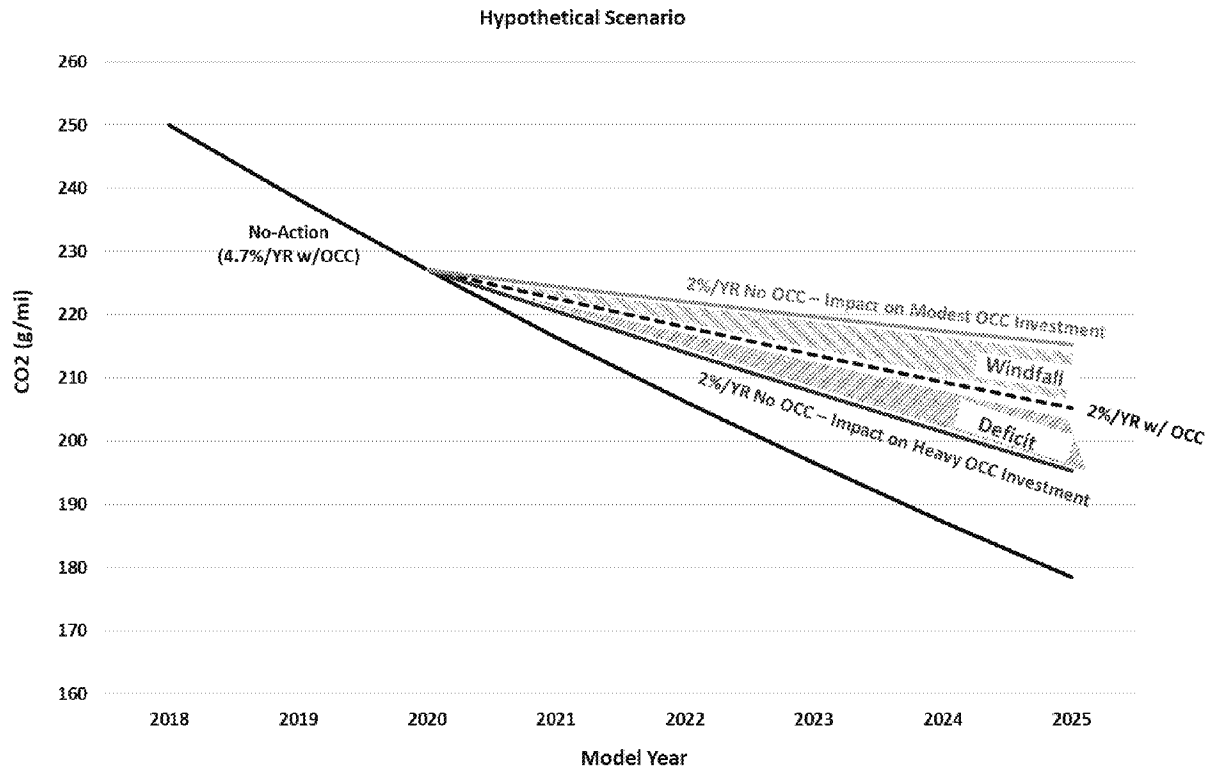
The value of a specific technology incentive depends on well it aligns with a manufacturer's technology strategy. Misalignment leads to competitiveness fairness concerns. To maintain competitive balance, Toyota suggests offering a menu of

[19] 83 Fed. Reg. at 43461.
[20] 83 Fed. Reg. at 43442.

flexibilities so manufacturers can select those best suited to their specific technology investments and plans.

The proposed alternatives where flexibilities have been removed do not appear to have received a stringency adjustment, and it is unclear whether adjustments can be made fairly. Alternatives 6 and 7 require the same an annual standard increase and differ only because Alternative 7 flexibilities are phased-out. The loss of flexibilities makes the stringency of Alternative 7 similar to the no-action alternative. We would expect proper Alternative 7 stringency adjustments to more closely approximate Alternative 6. Determining the appropriate adjustment of the standards is complicated by manufacturers having diverse flexibility plans. For example, an adjustment directed at companies with a heavy reliance on off-cycle technologies would create a relative windfall for companies with modest plans. Standards adjusted for the modest off-cycle plan would create a relative deficit for companies heavily invested in that compliance pathway as the image in figure 12 illustrates. Toyota has submitted the impact of lost flexibilities under CBI.

Figure 12 – Impact of Eliminating OCC Company Depend



Toyota supports expanding the existing hybrid credit provision, extending the current advanced technology sales multiplier, eliminating upstream emissions requirements, and streamlining off-cycle credit approvals while adding technologies to the pre-approved menu without credit limit. We support the Alliance and Global comments on flexibilities.

Expand Hybrid Technology Incentives Beyond Full-Size Pick-Ups

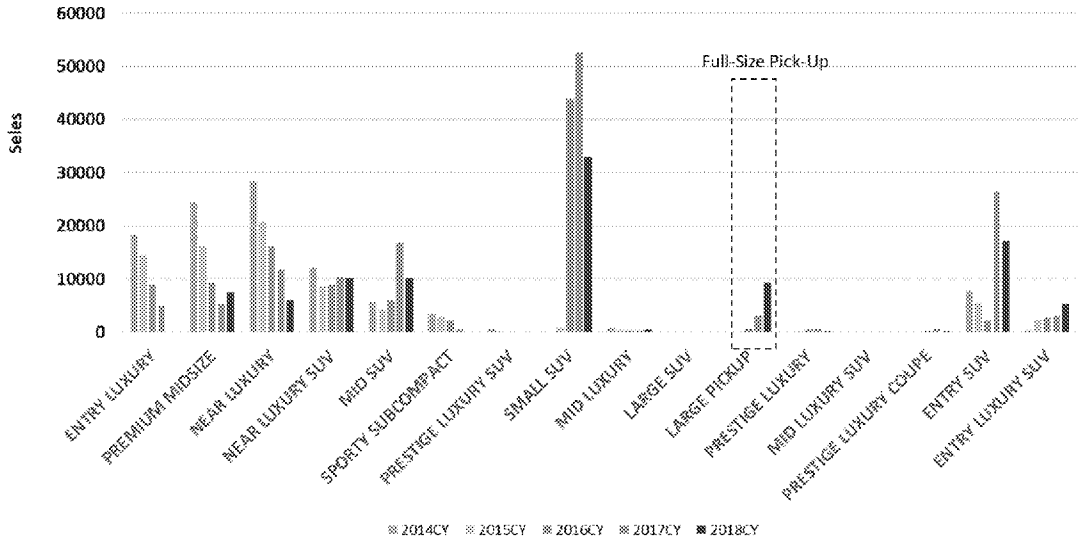
The proposed rulemaking notes that no company has taken benefit from the full-size pick-up truck provision and requests comment on whether it should be extended for 2017 model year and beyond, as well as be expanded to include more than full-size pick-up trucks.[21] Toyota requests the agencies extend the existing full-size hybrid pick-up provision to 2026 model year, apply the hybrid incentive to all light-duty trucks, and eliminate the minimum sales threshold. Toyota supports Alliance and Global Automakers comments on hybrid technology incentives. The proposed rulemaking finds that a 20 g/mi light-duty truck and 10 g/mi strong hybrid incentive causes negligible reduction in the stringency and benefits of the standards.[22]

The 2012 final rule provides incentives for full size pick-up trucks with hybrid systems, and other technologies that significantly reduce CO2 emissions and fuel consumption. The agencies focused the flexibility on full-size pickup trucks because of the challenge the 2017–2025 model year standards will present for large vehicles, including full-size pickup trucks, that are often used for commercial purposes and must maintain utility, towing and payload capability. The agencies' stated intent of these provisions is to incentivize the penetration of ''game changing'' technologies for large pickup trucks into the marketplace.[23]

Hybrid technology offers game changing potential certainly to all trucks and the market challenges are not limited to the full-size pick-up segment as seen in Figure 13 below.

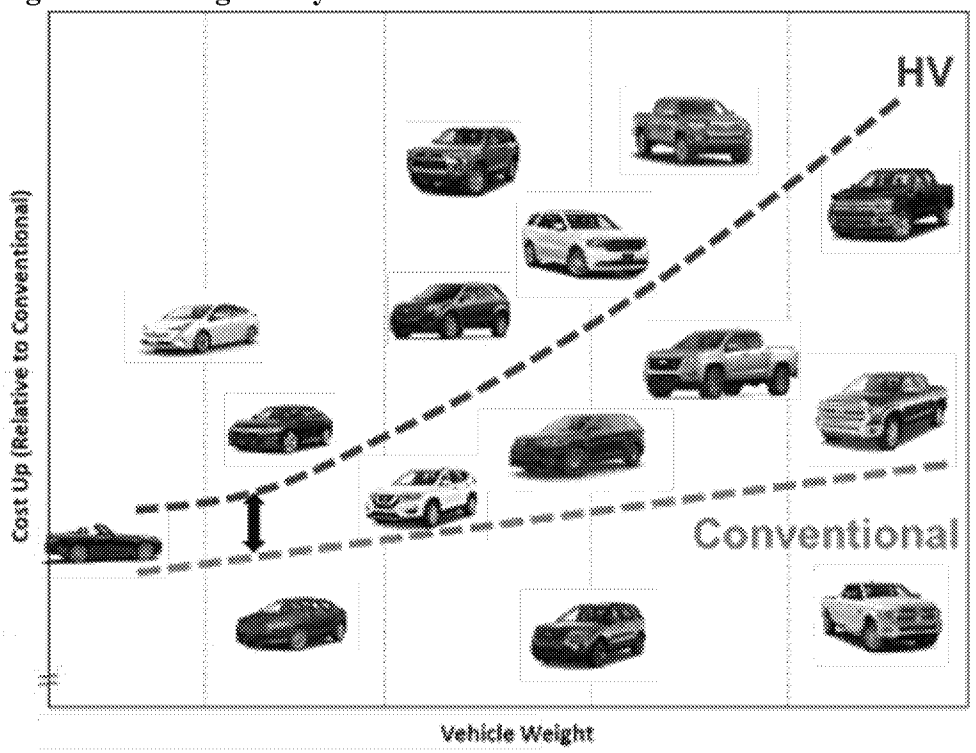
[21] 83 Fed. Reg. at 43454 and 43461.
[22] 83 Fed. Reg. at 43464 through 43466.
[23] Draft Technical Assessment Report, p. 11-6.

Figure 13 – Hybrid Sales by Market Segment



The primary challenge is the technology's cost premium over conventional powertrains which applies to all strong hybrid vehicle segments, but costs increase exponentially with increased vehicle weight and utility requirements as can be seen in Figure 14 below.

Figure 14 – Image of Hybrid Cost Versus Conventional Powertrains



The utility challenge for many SUVs and smaller pickup trucks is not too different from a full size pick-up truck. While the frequency of towing or work operation may be less frequent compared to a full-size pick-up, the system design and the resulting costs are nonetheless determined by the worst case or most severe conditions anticipated. To the extent utility requirements are less severe, promoting hybrid technology in the smaller truck segments, offers a less costly proving ground that can provide valuable experience about hybrid truck requirements and consumer preference that is transferrable to the design process for the full-size pickup segment. Building the consumer base for hybrids in the lighter truck segments can help promote the eventual adoption/acceptance in the more challenging larger truck segments.

More broadly, hybrid passenger cars and trucks can aid the transition to PHEVs, EVs, and FCs by building the industrial base required for electric vehicles which share common components (motors, power control systems, etc.) and production techniques as well as help socialize the market for greater levels of electrification. Even viewed as a bridge technology, conventional hybrids can provide game changing GHG reductions and warrant a technology incentive beyond large pickup trucks.

We believe one reason manufacturers have not leveraged the existing provision for full-size pick-up trucks is the restrictive minimum sales threshold which requires ten percent of a truck model's sales be comprised of strong hybrid powertrains before receiving credit. Hybrid powertrains comprise just under 2 percent of 2018 model year vehicles sales. Instead of motivating a good faith effort in deploying hybrid technology within a vehicle model, the threshold stifles innovation especially in an environment of low fuel prices.

Extend Advanced Technology Vehicle (ATV) Multipliers

As has been noted throughout the midterm evaluation process, the market uptake for advanced technologies such as electric vehicles and plug-in hybrids has been hampered by consumer preference, low fuel prices, and other factors which are discussed in greater detail in the Alliance and Global Auto comments.[24] A transition to these technologies will be needed for us to meet long term societal objectives as well as the CO2 targets associated with Toyota's Environmental Challenge 2050. The ATV multiplier incentive in the GHG program helps manufacturers manage the transition to electrification and other fuel sources like hydrogen by providing a reason for continued investment in both vehicle technology vehicles and supporting infrastructure in the absence strong consumer

[24] Alliance of Automobile Manufacturers comments on The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks Pgs. 29-31 and 59-62; and Association of Global Automakers comments on The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks; Pgs.33-36 and 58-61.

demand. However, the current provision expires after the 2021 model year and the loss of the incentive would hamper infrastructure expansion which is critical for greater market penetration of technologies like hydrogen fuel cell vehicles. We request the advanced technology incentive be extended to the 2026 model year in the GHG program and the provision be added to the CAFE program to help achieve the harmonization objective of the One National Program. Toyota supports the Alliance and Global Auto comments on extending the ATV multiplier.

Eliminate Upstream Emissions Requirements

Toyota strongly opposes manufacturers being held responsible for upstream emissions from electricity generation that the auto industry cannot control; doing so would create a significant disincentive to the necessary transition over to these advanced technologies. Toyota requests that standards for upstream emissions from light-duty vehicles be eliminated from the regulatory requirements. Greater detail is provided in the Alliance and Global comments.

Improve and Expand Off-Cycle Technologies

Off-cycle technologies which for the purposes of our comments include air conditioning leakage and efficiency technologies offer cost-effective compliance pathways to supplement the performance of technologies whose benefits can be measured fully over the official EPA two-cycle test. The agencies note "the modeling shows that phasing out

the A/C efficiency and off-cycle programs decreases fuel consumption over the 'no change' scenario but confirms that manufacturers will have to apply costlier technology to meet the standards."[25] As we've noted in previous comments, manufacturer investment in the deployment of off-cycle technologies is primarily motivated by the regulatory provision's compliance benefit because most of these technologies lack consumer demand. Toyota's compliance planning and investments in off-cycle technologies were made with the understanding that the regulatory provision would continue to be available. Eliminating the off-cycle flexibilities can harm planning, supplier arrangements, and investment recovery. The loss would also raise stringency and competitiveness fairness concerns as mentioned previously.

There is no erosion of benefits due to the off-cycle provision; it merely recognizes the benefits of technologies that reduce real-world fuel consumption and GHG emissions that would not otherwise be captured by the official test procedure. Given that off-cycle technologies provide tangible, quantifiable fuel savings and GHG reductions, we request

[25] 83 Fed. Reg. at 43464 through 43469.

the agencies streamline their approval process, expand the list of available pre-approved credits, and eliminate the cap on the menu credits.

The agencies request comment on how to streamline the approval process.[26] Toyota believes manufacturers and suppliers need a pre-approved "tool box" of standardized demonstration techniques for quantifying and validating real world benefits of off-cycle technologies in way that reduces approval uncertainty for the manufacturers and eases decision burden for the agencies. The scrutiny applied to off-menu technologies should match the existing knowledge level about a technology's performance and its sensitivity to the calibration of key design parameters and real-world application. Pre-approved menu technologies should receive no scrutiny. Toyota supports the Alliance recommended approach for speeding approvals of off-menu technologies to reduce burden while preserving the environmental and fuel saving benefits.[27]

Toyota supports various Alliance and Global comments on expanding the pre-approved menu of technologies and eliminating the limit on the compliance benefit that can be derived from the menu. A cap is not necessary as these technologies provide real benefits that can be verified through the streamlined approval process being proposed in the Alliance comments.

Retain Credit Banking and Trading

Toyota agrees with the assessment "that well-functioning banking and trading provisions increase market efficiency and reduce the overall costs of compliance with regulatory objectives."[28] However, the agencies have failed to provide a sufficient explanation for the concern about credit trading not being publicly reported. Pursuant to the regulations at 40 C.F.R. § 86.1865-12(l)(2)(ii) and 49 C.F.R. § 536.5, all credit transactions between manufacturers are reported to the agencies who in turn report those transactions at an aggregate level in the EPA's Annual GHG Compliance Report and NHTSA's CAFE Public Information Center. Given the limited number of transaction that take place for a typical model year, it's often possible to decipher which manufacturers engaged in credits trades.

The agencies have not explained potential risks created by companies not reporting the price of credits when noting that "the public is not made aware of inter-automaker trades, nor are shareholders. And even the agencies are not informed of the price of credits."[29] There is a risk that confidential compliance strategies could be reverse engineered if the

[26] 83 Fed. Reg. at 43462.
[27] Alliance of Automobile Manufacturers comments on The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks; Pgs. 84-88.
[28] 83 Fed. Reg. at 42999.
[29] 83 Fed. Reg. at 42998.

price of credits are made available. Toyota sees no reason to revise the existing banking and trading provisions in the CAFE and GHG programs except for extending the life of GHG credits as explained in the section below. Toyota supports the Alliance and Global Auto comments on credit reporting. We oppose the proposed CAFE reporting template and request EPA and NHTSA align reporting using the existing Verify System reporting format and procedures.

Extend GHG Credit Life

Toyota is requesting that the existing onetime carryover provision in the GHG program (currently is set to expire after the 2021 model year) be extended to the 2026 model year. GHG emissions credits earned from overcompliance during the early years of ONP should be available to manage compliance through the program's duration. The extended credit life will provide certainty for the credit market while providing auto companies flexibility to manage compliance and recoup technology investments.

Extending this provision causes no reduction in program stringency or benefits. We agree with the preamble that longer credit life can enable manufacturers to integrate credit banks into product plans potentially reducing costs.[30] The short lifetime of credits related to the amount of credit generation available can cause loss of earned compliance benefit gained from implementing costly early technological vehicle improvements which provide tangible emission reductions well into the future. If credits are forced to expire this results in more emission reductions being needed to comply with the requirements of the program, in effect, making the program more stringent. An environmental windfall from expiring credits is an unrealistic concept because credits facing expiration will more likely be purchased and used by another company.

In stationary source emission regulations, credit banking is not restricted because of the long term environmental and economic benefits of the displaced and reduced emissions. This shows the importance of credit banking provisions as a unique opportunity to provide both flexibility and stability in emission credit markets. In a GHG program, the long lifetime of atmospheric CO2 means the environmental benefit of CO2 reduction can be realized many years after the emission reduction occurs. The long lifespan of emissions impacts supports the rationale that GHG credit life should be unlimited or at least be significantly less constrained than 5 years which would support the GHG emissions credit market. As EPA has noted, "longer credit life would provide manufacturers with additional flexibility to further integrate banked credits into their product plans, potentially reducing costs."[31] The availability of credits will also support a vibrant credit market as can be seen in EPA's stationary source programs under the Acid

[30] 83 Fed. Reg. at 43464.
[31] 83 Fed. Reg. at 43464. See also 77 Fed. Reg. at 62798 (Oct. 15, 2012) (noting that carry forward credits "provide flexibility to account for market conditions that may impact year-over-year compliance").

Rain Program and the Cross-State Air Pollution Rule where current and historical performance is tracked by Clean Air Markets Division.

We support the Alliance and Global comments on extending the onetime carryover provision.

4) Harmonization

Toyota fully supports the One National Program for GHG and CAFE standards. Our ultimate goal remains a true, single national standard that governs fuel economy and greenhouse emissions for the U.S. fleet. When announcing the 2017-25 MY standards, the agencies pledged that "the goal . . . is to establish harmonized federal standards such that automobile manufacturers will be able to build a single light-duty national fleet that satisfies all federal and state requirements, while enabling consumers to still have a full range of vehicle choices."[32] However, to date the program has yet to achieve the objective of harmonization that underlies ONP.

Harmonized Stringency by Adding Flexibilities

Some of the alternatives suggest program harmonization can be achieved by eliminating non-statutory flexibilities which would make the GHG program more like the CAFE program. As explained previously, Toyota believes flexibilities play an important role in efficiently achieving near and long-term fuel consumption and GHG emissions reductions. Toyota requests all flexibilities be retained and incentives currently only in the GHG program be added to the CAFE program where possible. Below is the legal and regulatory rationale for continuing the existing hybrid technology incentive (expanded as previously described) and adopting the ATV incentive in the CAFE program.

Toyota strongly believes EPA/NHTSA should extend the multipliers for ATVs and expand the credits for hybrid technology. The Agencies have broad authority to establish incentives for the manufacture of ATVs. The CAFE statute, 49 U.S.C. § 32904(c), references EPA regulations for determining average fuel economy. EPA regulations at 40 C.F.R. § 600.510-12 establish a formula for calculating a manufacturer's fleet average fuel economy, to be reported to NHTSA to determine compliance with the applicable fuel economy standard. The same calculation has been carried over in the EPA regulations since first applied to MY1986 vehicles. This provision could be revised at one or two places to create a g/mi credit for hybrid vehicles and a sales multiplier for ATVs; either could be scaled depending on the type of technology used or the amount of time the vehicle operates on battery power.

[32] NHTSA. "NHTSA and EPA to Propose Greenhouse Gas and Fuel Efficiency Standards for Medium- and Heavy-Duty Trucks; Begin Process for Further Light-Duty Standards: Fact Sheet." (May 2010).

- In § 600.510-12(c), provide a multiplier for qualified ATVs. Subsections of this section already provide a multiplier for other types of alternative-fueled vehicles.
- In § 600.510-12(e), provide a g/mi credit hybrid technology.

This goal is consistent with the purposes of both the Energy Policy and Conservation Act (EPCA) of 1975 and the Energy Independence and Security Act (EISA) of 2007. Establishing a multiplier for hybrid vehicles within the fleet average fuel economy calculation would not require a change to the passenger automobile test procedure and would create incentives for the development and manufacture of advanced technology vehicles. The change would be a simple, mathematical increase giving greater weight to advanced technology vehicles in the equation used to calculate fuel economy/greenhouse gas levels.

The CAFE statute, 49 U.S.C. § 32904, does not prohibit EPA or NHTSA from creating incentives for advanced vehicles; in fact, section 32904(a)(1)(A) directs the Administrator to calculate a manufacturer's average fuel economy "in a way prescribed by the Administrator."[33] Providing a multiplier, either in the provision by which a manufacturer calculates fuel economy values for a model type, or in the sales weight portion of the calculation of overall fleet average fuel economy, would be consistent with this statutory section.[34]

EPA proposed an identical multiplier in the proposed GHG/fuel economy rule for MYs 2012-16, explaining that the approach was consistent with "promoting the technology-based emission reduction goals of section 202(a)(1) of the Clean Air Act."[35] In that rule, EPA intended to encourage the commercialization of electric vehicles, plug-in hybrid electric vehicles, and fuel cell vehicles through a multiplier.[36] Although EPA did not establish the proposed multiplier in the final rule for policy reasons, no concerns were raised regarding the agency's authority to do so.[37]

As noted above, 40 C.F.R. § 600.510-12 provides a method for determining the fuel economy value for each category of vehicles. This provision could be revised at § 600.510-12(c)(2) by inserting multipliers for various types of ATVs, similar to the existing multipliers for alcohol- and natural gas-fueled vehicles. Section 600.510-12(e)

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[33] 42 U.S.C. § 32904.
[34] If EPA believes that section 32904(a)(1)(B) precludes the agency from creating multipliers for hybrid passenger cars, due to language that requires fuel economy to be based on automobiles manufactured by a manufacturer, then EPA nevertheless has the authority to create such multipliers for hybrid trucks. The statute does not set out the formula for determining the fuel economy of light trucks. This reading also would be consistent with NHTSA's interpretation of section 32904(c) as not prohibiting that agency from revising the test procedures for light trucks, while prohibiting revisions to the passenger car test procedures.
[35] 74 Fed. Reg. 49,454, 49,533 (Sept. 28, 2009).
[36] *Id.* ("EPA proposes that these advanced technology credits would take the form of a multiplier that would be applied to the number of vehicles sold such that they would count as more than one vehicle in the manufacturer's fleet average. These advanced technology vehicles would then count more heavily when calculating fleet average CO_2 levels. The multiplier would not be applied when calculating the manufacturer's foot-print-based standard, only when calculating the manufacturer's fleet average levels.")
[37] *See* 75 Fed. Reg. 25,324, 25,402, 25,444 (May 7, 2010).

could be revised by providing an additional multiplier to give hybrids a heavier sales weight.

Additionally, the EPCA and EISA statutes provide ample authority to revise the light truck test procedure to generate additional credits for fuel cell, battery electric, plug-in electric, and hybrid technologies.[38] NHTSA has interpreted the statute as allowing the agency to revise the light truck test procedure. In the final fuel economy/GHG rule for MY2012-16 vehicles, NHTSA stated, "In measuring the fuel economy of passenger cars, EPA is required by EPCA to use the EPA test procedures in place as of 1975 (or procedures that give comparable results), which are the city and highway tests of today, with adjustments for procedural changes that have occurred since 1975. EPA uses similar procedures for light trucks, although, as noted above, EPCA does not require the Agency to do so.[39] Also in the MY2012-16 final rule, NHTSA noted the inherent flexibility in section 32904 when discussing air conditioning credits for light trucks.[40] The fuel economy adjustment factor for light trucks could be amended to generate additional credits for fuel cell, battery electric, plug-in electric, and hybrid vehicles to

reflect the amount of power generated by the vehicle's battery or the amount of time the vehicle runs on electric power. The revisions to the calculation could be tailored to provide varying credit amounts based on the type of advanced technology and/or amount of associated fuel economy/GHG improvement for different categories of ATVs.

Harmonize Credit Transfers

The agencies request comment on whether the current system as implemented might need improvements to achieve greater program efficiency.[41] In that spirit, Toyota requests NHTSA should make a more liberal interpretation of the credit transfer caps in 49 U.S.C. 32903(g)(3). NHTSA has offered two very different interpretations of this provision. The proposed rulemaking acknowledges that in the final rule for the 2012-2016 model year CAFE and GHG standards NHTSA states "a manufacturer could transfer a certain number of credits each year and bank them, and then the credits could be carried forward or back 'without limit' later if and when a shortfall ever occurred in that same fleet also have excess credits instead of transferring only to a fleet that has a credit shortfall".[42] This initial interpretation seemed designed to promote harmonization as the CAFE and GHG requirements were brought together for the first time under One National Program.

NHTSA subsequently interpreted the provision to mean "the transfer cap applies at the time the credits are used" and explains in the preamble of the proposed rulemaking that

[38] 49 U.S.C. § 32904.
[39] 75 Fed. Reg. at 25,557 (emphasis added).
[40] 75 Fed. Reg. at 25,663.
[41] 83 Fed. Reg. at 42999.
[42] 83 Fed. Reg. at 43452.

this second interpretation is a more appropriate, plain language reading of the statute.[43] NHTSA does not provide a sufficient explanation for why it believes the second interpretation is the more appropriate understanding of the statutory language, when NHTSA's preferred interpretation in fact requires a more convoluted reading of the statute . With either interpretation, the transfer cap remains in place. Fuel savings is not practically affected because any earned overcompliance credits are typically sold to and used by another manufacturer rather than being allowed to expire.

NHTSA clearly has a choice, either of which would be consistent with EISA, and satisfy the intent of Congress. Toyota requests NHTSA reconsider and accept the Alliance and Global Auto request that NHTSA add text to the definition of "transfer" stating that the statutory transfer cap in 49 U.S.C. 32903(g)(3) applies when the credits are transferred. Such an interpretation would better align CAFE credit transfers with the unlimited transfers in the GHG program.

Standard Levels Need to Reflect Harmonization

To the extent the CAFE and GHG program flexibilities are not harmonized, there needs to be an appropriate offset between the CAFE and GHG footprint standards. Currently, the CAFE standards are set below the GHG standards (in miles per gallon space) to account for AC leakage not being part of the CAFE program. However, this offset is inadequate to address the relative increased CAFE stringency caused by the lack of other flexibilities. A proper correction would result in the CAFE standards being even more relaxed relative to the GHG standards.

Toyota support Alliance and Global comments on flexibilities and harmonization. Toyota supports the joint Alliance and Global Auto harmonization petition submitted to the agencies in 2016.[44]

5) Legal Considerations

While the Standards Previously Codified by EPA and Set as Augural by NHTSA Need to Be Changed from their Current Level, the Energy Policy and Conservation Act and the Clean Air Act authorize Vehicle Standards that Provide for Year-over-Year Improvements in Fuel Economy and GHG Emission Reductions.

The purpose of the Mid-Term Evaluation is to serve as a check to determine if the standards covering Model Years (MY) 2022-2025, which were set more than 10 years in

[43] Ibid.
[44] Alliance of Automobile Manufacturers and Association of Global Automakers, Petition for Direct Final Rule with Regard to Various Aspects of the Corporate Average Fuel Economy Program and the Greenhouse Gas Program, June 20, 2016.

advance, continue to meet the statutory criteria set forth in EPCA and the Clean Air Act. NHTSA must weigh four Energy Policy and Conservation Act (EPCA) factors to determine the "maximum feasible" fuel economy standards: "technological feasibility, economic practicability, the effect of other motor vehicle standards of the Government on fuel economy, and the need of the United States to conserve energy." "Other motor vehicle standards" include safety regulations, and "economic practicability" includes consumer acceptance.

Section 202 of the Clean Air Act (CAA) directs EPA to set standards "applicable to the emission of any air pollutant" from certain motor vehicles "which in [the Administrator's] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare." Section 202 further requires EPA to provide adequate lead-time for manufacturers to develop and apply the requisite technology, with appropriate consideration to costs of compliance within that period. Safety is also a consideration; section 202(a)(4) of the Clean Air Act prohibits the use of any emission control device, system, or design that will cause or contribute to an unreasonable risk to public health, welfare, or safety. Both agencies have discretion on how to apply these factors, and in particular, how much weight each factor should be given.

The data presented above, together with the data contained in the comments from the Alliance of Automobile Manufacturers and Global Automakers, make clear that the standards in the 2012 final rules do not meet the criteria in either the CAFE statute or the Clean Air Act. That said, these statutes support an adjustment to those standards that reflect the realities of the market, consumer choice, and the pace of technological advancement acceptable to consumers.

Toyota supports vehicle standards that gradually increase year-over-year. Continuing on the path of increasing standards provides investment certainty and makes the standards robust and resilient over the long-term. Gradually increasing standards over time provides certainty for research and development direction, encourages investment in manufacturing, and provides consumers sufficient choice among a wide range of fuel efficient vehicles. These are factors that will provide a solid statutory basis for a revision from the existing standards.

Preemption and Waiver—Uncertainty will Harm Toyota and the Industry

In the NPRM, NHTSA proposes to conclude that the California vehicle GHG and zero-emission vehicle (ZEV) standards are preempted under EPA. EPA also proposes to withdraw California's waiver for its vehicle GHG and ZEV programs. Toyota does not believe that these actions are warranted or necessary at this time to ensure a single, nation-wide program regulating vehicle GHG emissions and fuel economy. Rather, taking these steps will fracture the current national program, resulting in litigation at the

expense of regulatory certainty and at great cost to manufacturers, including Toyota, that must develop compliance strategies for a patchwork of ever-changing regulatory requirements.

A. EPCA Preemption is Unnecessary and Will not Achieve the Goal of a Unified, National Fuel Economy and GHG Program.

NHTSA proposes to find that the California vehicle GHG emission standards ZEV requirements are both expressly and impliedly preempted under the Energy Policy and Conservation Act (EPCA). NHTSA explains that preemption of the California programs is necessary to ensure a single national standard for fuel economy and GHG emissions. Like NHTSA's position on preemption, Toyota's position on the need for a single, nationally-applicable set of GHG and fuel economy standards has been consistent for over a decade. Toyota fully supports NHTSA's stated goal of maintaining a single set of standards. However, Toyota believes invoking preemption is not the most effective and appropriate means of achieving this vital policy objective at this time.

As NHTSA acknowledges in the NPRM, two district courts found that California's GHG emission standards are not preempted by EPCA. As part of the first One National Program agreement between the federal government, California, and the auto industry, appeals of the district courts' decisions were dismissed and no final legal decision was reached on the merits of EPCA preemption. Whether the ZEV standards are expressly or impliedly preempted by EPCA is a new position, the merits of which have not been subject to judicial review. Settling these legal questions is certain to require protracted, costly litigation, during which Toyota would be faced with uncertain and unpredictable compliance requirements as the federal and California standards undergo judicial review. This uncertainty and shifting regulatory landscape will be amplified if California moves to revoke the deemed-to-comply provision of its GHG regulatory program, as it has recently done over the objections of the auto industry, further driving up compliance costs for Toyota, which in turn will impact employment and consumer choice.

NHTSA can avoid creating this unnecessary legal quagmire, which will ultimately harm both Toyota and consumers. Rather than preempting the California GHG and ZEV regulations, Toyota urges NHTSA to engage with California to reach agreement on a set of aggressive, but achievable, standards that will maintain a unified, national approach to fuel economy and GHG emission regulation. Doing so will achieve the same result as preemption—a continued One National Program—without the extended litigation and regulatory uncertainty that a preemption determination would cause.

If NHTSA is unable to reach an agreement with California, however, then Toyota believes that EPCA preemption of state standards will be necessary to ensure a continued nationwide fuel economy program. In that circumstance, EPCA preemption will be the only available option to preserve a nationally-applicable approach to regulating fuel

economy. NHTSA has clear statutory authority under EPCA to preempt any California standards that would frustrate the goal of national uniformity due to the direct relationship between fuel economy and GHG emissions, as discussed in detail in the NPRM. In the event that NHTSA, EPA, and California will no longer cooperate to implement a One National Program, Toyota would support NHTSA's decision to preempt state regulation of vehicle GHG emissions.

B. Withdrawing the Waiver of Preemption for California's GHG and ZEV Programs will Similarly Frustrate the Policy Goal of Maintaining a Single Set of National GHG and Fuel Economy Standards.

For similar reasons, Toyota does not support EPA's proposal in the proposed rulemaking to withdraw the January 9, 2013, waiver of preemption for California's MY 2021-2025 GHG standards and ZEV mandate unless there is no other means to achieve a single nationwide GHG regulatory program. Years of litigation and compliance uncertainty will result from the withdrawal of California's waiver. During this time, Toyota, like other vehicle manufacturers, will be forced to develop compliance strategies for years in which the applicable federal and California standards are unclear and subject to change following judicial review. Efficient product planning requires certainty, which the withdrawal of California's waiver will not provide at this time. Only if, and when, California removes the deemed-to-comply provision from its GHG regulation, should EPA begin to consider whether to withdraw California's waiver.

However, the need to reconsider or revoke California's waiver at this time is avoidable. Instead, Toyota urges EPA to engage with California to develop a set of GHG standards for MY 2021-2025 that are aggressive, yet achievable, and which will maintain the current framework of a single, nationally-applicable GHG regulatory program. Toyota strongly believes that this outcome, rather than a fragmented approach to GHG regulation amidst the uncertainty created by litigation, will provide economic benefits to consumers, support customer choice, and maintain important safety improvements.

With regard to consideration of future waiver requests from California for ZEV standards beyond MY 2025, Toyota echoes the comments of Global Automakers on the need to assess the feasibility of compliance with the ZEV mandate in the 177 States. Focusing only on whether the ZEV requirements, as implemented in California, meet the Clean Air Act requirements for a waiver of preemption is too narrow an inquiry. When the 177 States adopt a ZEV mandate, it must be identical to California's ZEV regulation; EPA should therefore take into account the effect of those states' actions during any ZEV waiver consideration process.

7) Appropriate CAFE and GHG Standards

The ONP CAFE and GHG standards have clearly ushered in progress. Between the 2012 model year start and the 2018 model year, 2-cycle fuel economy for the U.S. fleet has increased by 10.7 percent for passenger cars and 14.8 percent for trucks. Yet, moving forward, we face an increasingly daunting compliance task, even if the recent rate of progress continues.

The compliance challenge is driven largely by two factors. First, agency assumptions about the capability of technologies deemed as the primary compliance pathway back in 2012 have proven incorrect. The continued deployment of leading edge conventional gasoline powertrain and load reduction technologies are projected to fall short of the current "no-action" standards. Second, important assumptions around various market-related issues have also proven incorrect, such as significantly lower gasoline prices than expected and the historic shift from cars to light-trucks and sport utility vehicles (SUVs). The net result is that compliance will likely require significant increases in vehicle electrification at the very time when such vehicles are struggling to gain consumer acceptance. Even if the market challenge for electrification were somehow suddenly overcome, insufficient time remains to adequately manage product design cycles, production capability and technology investments, and product plans.

Because of these factors, and consistent with the original intended purpose of the Mid-Term Evaluation, Toyota supports regulatory adjustments and expansion of flexibilities that will promote advanced technologies and continue to provide meaningful energy security and climate benefits while better aligning with market realities.

Adjustments in the regulations will not slow Toyota's cleaner mobility commitments nor forestall our technology investments and efficiency improvements. They will improve our ability to offer clean, safe, affordable vehicles that our customers want to buy. We look forward to working with the agencies, states and other related stakeholders as this process moves towards a final rule.